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ORIGINAL ARTICLE

Unique HIV Risk Factors and Prevention Needs for Transgender Women and Cisgender Men Who Have Sex with Men in Bangkok, Thailand

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Abstract

Background: Transgender women (TGW) and cisgender men who have sex with men (cis-MSM) are often grouped together as key populations. We evaluated behavioral and other characteristics that may distinguish TGW from cis-MSM in Bangkok, Thailand.

Methods: We enrolled into an 18-month cohort cis-MSM and TGW 18–35 years of age without HIV, who reported anal intercourse plus condomless anal intercourse, multiple partners, transactional sex, and/or sexually transmitted infection. Robust multivariable Poisson regression was used to estimate adjusted prevalence ratios (aPRs) and confidence intervals (95% CIs) for associations with being a TGW. Among TGW, logistic regression with generalized estimating equations was used to estimate adjusted odds ratios (aORs) and 95% CIs for associations with taking hormones and having undergone gender affirmation surgery (GAS).

Results: From 2017 to 2019, 660 cis-MSM and 348 TGW were enrolled. Compared to cis-MSM, TGW were more likely to be attracted to mostly/only men (aPR: 3.79, 95% CI: 1.57–9.13), have a higher monthly income (aPR: 1.25, 95% CI: 1.04–1.50), have lived in their current residence for <1 year (aPR: 1.21, 95% CI: 1.01–1.46), have engaged in sex work (aPR: 1.48, 95% CI: 1.23–1.77), and be less likely to have ever undergone HIV testing (aPR: 0.83, 95% CI: 0.70–0.98). Among TGW, 149 (42.8%) were taking hormones and 33 (9.5%) had undergone GAS. GAS was more common among TGW who ever used methamphetamines (aOR: 1.55, 95% CI: 1.00–2.41) and those >23 years (18–20-year olds aOR: 0.17, 95% CI: 0.05–0.55; 21–23-year olds aOR: 0.36, 95% CI: 0.20–0.65).

Conclusions: TGW and cis-MSM are unique populations; tailored, gender-affirming, differentiated models of HIV prevention and care are necessary to address vulnerabilities specific to each key population.

Keywords: HIV; sexual and gender minorities; Thailand; transgender persons

Introduction

Previous HIV-related studies have often conflated data across men who have sex with men (MSM) and transgender women (TGW),[1–6] yet unique characteristics of TGW and MSM that may differentially impact HIV risk warrant further attention. TGW are 49 times more likely to be living with HIV than adults in the general population,[2] and are more likely than MSM to have exchanged sex for money or goods, been forced to have sex, had receptive anal intercourse, engaged in sex work, used recreational drugs, and lower education and income levels.[7,8]

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While previous research among TGW has focused on sociodemographic and behavioral risk factors for HIV, which are exacerbated by stigma and lack of gender-affirming care, other risk factors that are unique to this population should be considered. For example, TGW are more likely to use fillers without medical supervision or nonsterile substitutes that may be contaminated. In addition, hormone replacement therapy may impact HIV acquisition due to the influence of sex hormones on antiretroviral therapy levels, mucosal epithelial thickness, and expression of HIV co-receptors in mucosal T cells.[9]

In Asia and the Pacific, 10 countries, including Thailand, accounted for 96% of new HIV infections in 2015.[10] Between 2005 and 2015, an incidence rate of 4.8 cases per 100 person-years (confidence interval [95% CI] 4.4–5.4) was reported among MSM and TGW attending voluntary counseling and testing services in Bangkok,[11] ~17 times higher compared with the general population as observed in the placebo arm of the RV144 candidate HIV vaccine trial between 2003 and 2008.[12] Prior studies from Thailand have shown that TGW have approximately twice the prevalence of HIV compared to MSM,[13] and face unique barriers to HIV testing.[14]

In 2019, the Joint United Nations Programme on HIV/AIDS (UNAIDS) reported that HIV prevalence among transgender people in Thailand was 11%, with only 42% knowing their HIV status and 6% avoiding health care due to stigma and discrimination.[15] Transgender-specific packaging of HIV care and treatment services in Bangkok has resulted in decreasing HIV incidence among engaged TGW,[16] but scale-up of such services outside of Bangkok is needed.[17]

We hypothesized that differing socioeconomic factors and health behaviors may contribute to differential risk for HIV between TGW and cisgender MSM (cis-MSM). We explored these associations to risk of HIV acquisition using data from a longitudinal HIV incidence study among TGW and MSM in Bangkok, Thailand, to better inform the specific health care and HIV prevention needs of each gender identity group.

Methods

Study design and participants

This prospective observational cohort enrolled cis-MSM and TGW at risk for HIV at two sites, the Vaccine Trial Centre at Mahidol University and the Royal Thai Army Clinical Research Centre in Bangkok, Thailand, as previously described.[18] Individuals were eligible for enrollment if they were 18 to 35 years old, were without HIV, were residing in Bangkok, were assigned male sex at birth, and reported anal intercourse, in addition to one of the following in the past 6 months: condomless anal intercourse with a male or TGW partner of positive or unknown HIV status; anal intercourse with three or more male or TGW sexual partners; anal intercourse for money, goods, or drugs; or diagnosis of a sexually transmitted infection (STI).

Participants completed a screening visit and an enrollment visit around 2 weeks later, and were then followed at 3, 6, 12, and 18 months after enrollment. The study was reviewed and approved by the institutional review boards at Walter Reed Army Institute of Research, Faculty of Tropical Medicine at Mahidol University, and the Royal Thai Army (WRAIR No. 2353). All participants provided written informed consent.

Study procedures

All participants received voluntary counseling and testing from trained research nurses at every visit. An extensive computer-assisted self-administered HIV behavioral assessment was completed at screening and each follow-up visit, excluding the enrollment visit. Questions asked about self-reported potential HIV risk factors, including sexual behaviors, condom use, filler use, and drug and alcohol use. Fillers were defined as silicone, collagens, or others used to change the participant's appearance, which are injected into the area that the participant wishes to change, such as face, buttock, or hips.

Among TGW, questions around self-reported gender affirmation processes were asked, including about living in a cross-gender role, receiving counseling, using hormones, and completion of at least one gender affirmation surgery (GAS),[19,20] defined as surgery involving the breasts or genitals.[18] Our survey did not differentiate between specific types of GAS.

Statistical analyses

We followed the CDC-recommended two-step method to define TGW and cis-MSM.[21] Participants were asked what sex they were assigned at birth on their birth certificates (male or female) and how they describe their current gender identity (male, female, TGW, or transgender man). Participants who self-reported male assigned sex at birth and current male gender identity were characterized as cis-MSM. Participants

who self-reported male assigned sex at birth and current female or TGW gender identity were characterized as TGW. Participants defined as cis-MSM or TGW at enrollment were included in these analyses. Gender status at enrollment was carried forward across all follow-up visits for each participant.

Using cross-sectional data from evaluations across the screening and enrollment visits, Fisher's exact tests were used to identify demographic, behavioral, and other differences between cis-MSM and TGW. Among TGW, gender affirmation processes, sexual behaviors, condom use, and filler use were described. Generalized linear models with a Poisson distribution and robust standard errors were used to estimate unadjusted and adjusted prevalence ratios and 95% CIs for associations of self-reported demographics and other characteristics with being TGW.[22]

Using data from all available study visits completed by TGW participants, logistic regression with generalized estimating equations was used to estimate unadjusted and adjusted odds ratios and 95% CIs for factors potentially associated with (1) taking hormones and (2) having completed at least one GAS.

For these exploratory analyses, all potential risk factors specified *a priori* were included in the adjusted regression models. We tested for multicollinearity using the variable inflation factor (VIF); all variables included in the adjusted models had a VIF <2.

Analyses were performed in Stata 15.0 (StataCorp, College Station, TX).

Results

Study population

Between April and October 2017, 1184 potential participants were screened and 1017 enrolled. Nine participants were excluded from analyses, including six who described their gender identity as transgender man and three who did not answer gender questions.

Among the 1008 participants included, 660 (65.5%) were cis-MSM and 348 (34.5%) TGW at their initial visit (Table 1), including 205 (20.3%) who reported a different gender identity at least once over the course of the study. Of the 205 reporting a different gender identity at least once during the study, 88 (42.9%) were defined as cis-MSM and 117 (57.1%) were defined as TGW at the initial visit ($p<0.001$). Participants were a median age of 22 (interquartile range [IQR] 21–25) years, and the median number of sexual partners in the past 6 months was 3 (IQR 1–5).

Factors associated with being TGW

Factors independently associated with being a TGW included being attracted to mostly or only men, having a monthly income of 15,000 Baht ($\sim$460 USD) or higher, having lived in current residence for <1 year, and having engaged in sex work in the past 6 months (Table 2). Factors inversely associated with being a TGW included educational attainment beyond elementary school and having ever tested for HIV.

Filler use among TGW

Filler use was more prevalent among TGW than cis-MSM (27.6% vs. 8.6%, $p<0.001$), and a greater proportion of TGW than cis-MSM had fillers injected outside of a clinic (31.9% vs. 17.9%, $p=0.06$).

Among the 96 TGW who had ever injected fillers, 64 (66.7%) reported having them injected at a clinic by a doctor or nurse, 20 (20.8%) reported injection at a friend's house, 7 (7.3%) reported another unspecified location, 3 (3.1%) at their own house, and 2 (2.1%) did not respond. Among these 96 TGW who had injected fillers, 63 (65.6%) reported never reusing needles, while 25 (26.0%) said they did not know if they reused needles. Among the 25 TGW who said they were not sure if they had reused needles, 14 (56.0%) said their fillers were injected at a clinic by a doctor or nurse, 6 (24%) said they were injected at a friend's house, 4 (16.0%) said they were injected at a place other than a clinic, pharmacy, at home, or at a friend's house, and one person did not specify a location.

Among TGW who reported filler use, 42 (43.8%) had injected fillers within in the past year, compared to 26 (27.1%) in the past 6 months, 21 (21.9%) in the past month, and 3 (3.1%) in the past week; however, 61 (63.5%) reported using fillers only once a year. Any lifetime history of filler use was reported by a greater proportion of TGW who used hormones compared to those who did not (34.2% vs. 22.6%, $p=0.02$), and a greater proportion of TGW who had completed at least one GAS compared to those who had not completed any GAS (60.6% vs. 24.1%, $p<0.001$).

Gender transition among TGW

Among the 348 TGW included in these analyses, 149 (42.8%) reported taking hormones, of whom 103 (69.1%) reported taking them for two or more years. The most common places to get information on hormone therapy were from friends (78, 52.4%) and online (33, 22.2%). The most common place to purchase hormones was at a pharmacy (120, 80.5%).

Table 1. Characteristics of Cisgender Men Who Have Sex with Men and Transgender Women Enrolled in an HIV Incidence Study at Two Clinics in Bangkok, Thailand

	All ($n=1008$)	Cisgender MSM ($n=660$)	TGW ($n=348$)	p
Age, years				
18–20	254 (25.2%)	159 (24.1%)	95 (27.3%)	0.53
21–23	391 (38.8%)	259 (39.2%)	132 (37.9%)	
>23	363 (36.0%)	242 (36.7%)	121 (34.8%)	
Sexual attraction				
Mostly/only men	782 (77.6%)	454 (68.8%)	328 (94.3%)	**<0.001**
Both men and women	196 (19.4%)	180 (27.3%)	16 (4.6%)	
Mostly/only women	25 (2.5%)	21 (3.2%)	4 (1.1%)	
Unknown/missing	5 (0.5%)	5 (0.8%)	0 (0.0%)	
Education level				
None/some elementary	16 (1.6%)	6 (0.9%)	10 (2.9%)	**0.003**
High school	182 (18.1%)	104 (15.8%)	78 (22.4%)	
Vocational training	65 (6.4%)	40 (6.1%)	25 (7.2%)	
Some university	537 (53.3%)	360 (54.5%)	177 (50.9%)	
Completed university/more	208 (20.6%)	150 (22.7%)	58 (16.7%)	
Monthly income				
<15,000 Baht	633 (62.8%)	429 (65.0%)	204 (58.6%)	0.13
≥15,000 Baht	341 (33.8%)	210 (31.8%)	131 (37.6%)	
Unknown/missing	34 (3.4%)	21 (3.2%)	13 (3.7%)	
Length of current residence, years				
<1	236 (23.4%)	140 (21.2%)	96 (27.6%)	**0.03**
1–2	182 (18.1%)	126 (19.1%)	56 (16.1%)	
>2	578 (57.3%)	383 (58.0%)	195 (56.0%)	
Unknown/missing	12 (1.2%)	11 (1.7%)	1 (0.3%)	
Injection drug use (lifetime)				
Never	920 (91.3%)	608 (92.1%)	312 (89.7%)	**0.004**
Ever	78 (7.7%)	42 (6.4%)	36 (10.3%)	
Unknown/missing	10 (1.0%)	10 (1.5%)	0 (0.0%)	
Methamphetamine use (lifetime)				
Never	874 (86.7%)	581 (88.0%)	293 (84.2%)	0.09
Ever	118 (11.7%)	67 (10.2%)	51 (14.7%)	
Unknown/missing	16 (1.6%)	12 (1.8%)	4 (1.1%)	
Site				
RTA	508 (50.4%)	321 (48.6%)	187 (53.7%)	0.13
VTC	500 (49.6%)	339 (51.4%)	161 (46.3%)	
No. of sex partners in past 6 months				
1 to 3	297 (29.5%)	194 (29.4%)	103 (29.6%)	0.17
4 to 7	397 (39.4%)	274 (41.5%)	123 (35.3%)	
8 or more	297 (29.5%)	182 (27.6%)	115 (33.0%)	
Missing	17 (1.7%)	10 (1.5%)	7 (2.0%)	
History of sex work in past 6 months				
No	789 (78.3%)	546 (82.7%)	243 (69.8%)	**<0.001**
Yes	219 (21.7%)	114 (17.3%)	105 (30.2%)	
Forced sex				
Never	836 (82.9%)	563 (85.3%)	273 (78.4%)	**0.01**
Ever	172 (17.1%)	97 (14.7%)	75 (21.6%)	
Tested for HIV				
Never	590 (58.5%)	378 (57.3%)	212 (60.9%)	0.29
Ever	415 (41.2%)	279 (42.3%)	136 (39.1%)	
Missing	3 (0.3%)	3 (0.5%)	0 (0.0%)	

Participants were enrolled at the VTC and the RTA in Bangkok, Thailand. Eligibility criteria included age 18 to 35 years, without HIV, residing in Bangkok, assigned male sex at birth, and self-reported history of anal intercourse and one or more of the following: condomless anal intercourse with a male or TGW partner of positive or unknown HIV status; anal intercourse with three or more male or TGW sexual partners; exchange of anal intercourse for money, goods, or drugs; and/or sexually transmitted infection diagnosed in the past 6 months. Data are presented as *n* (column percentage). *p*-Values were calculated using Fisher's exact tests and bold indicates significance at $p<0.05$.

MSM, men who have sex with men; RTA, Royal Thai Army Clinical Research Centre; TGW, transgender women; VTC, Vaccine Trial Centre at Mahidol University.

Table 2. Factors Associated with Being a Transgender Woman in Bangkok, Thailand

	Unadjusted PR (95% CI)	Adjusted PR (95% CI)
Age, years		
18–20	1.12 (0.90–1.39)	1.11 (0.86–1.44)
21–23	1.01 (0.83–1.24)	1.06 (0.84–1.34)
>23	Ref.	Ref.
Sexual attraction		
Mostly/only men	**3.15 (1.26–7.87)**	**3.79 (1.57–9.13)**
Both men and women	0.61 (0.22–1.71)	0.65 (0.24–1.74)
Women only[a]	Ref.	Ref.
Education level		
None/some elementary	Ref.	Ref.
High school	0.69 (0.45–1.04)	**0.61 (0.41–0.91)**
Vocational training	0.62 (0.38–1.00)	**0.61 (0.39–0.98)**
Some university	**0.53 (0.35–0.79)**	**0.43 (0.29–0.64)**
Completed university/more	**0.45 (0.29–0.69)**	**0.38 (0.25–0.59)**
Monthly income		
<15,000 Baht[a]	Ref.	Ref.
≥15,000 Baht	1.18 (0.99–1.40)	**1.25 (1.04–1.50)**
Length of current residence, years		
<1	**1.22 (1.01–1.48)**	**1.21 (1.01–1.46)**
1–2	0.93 (0.72–1.18)	1.00 (0.79–1.27)
>2[a]	Ref.	Ref.
Injection drug use (lifetime)		
Never[a]	Ref.	Ref.
Ever	**1.38 (1.07–1.78)**	1.21 (0.89–1.66)
Methamphetamine use (lifetime)		
Never[a]	Ref.	Ref.
Ever	**1.30 (1.03–1.63)**	1.02 (0.77–1.36)
Site		
RTA	Ref.	Ref.
VTC	0.88 (0.74–1.04)	1.03 (0.87–1.23)
No. of sex partners in past 6 months		
1 to 3	Ref.	Ref.
4 to 7	0.89 (0.72–1.11)	0.83 (0.67–1.02)
8 or more[a]	1.12 (0.91–1.38)	0.89 (0.71–1.10)
History of sex work in past 6 months		
No[a]	Ref.	Ref.
Yes	**1.56 (1.31–1.85)**	**1.48 (1.23–1.77)**
Forced sex		
Never[a]	Ref.	Ref.
Ever	**1.34 (1.10–1.62)**	1.08 (0.89–1.30)
Tested for HIV		
Never[a]	Ref.	Ref.
Ever	0.92 (0.77–1.09)	**0.83 (0.70–0.98)**

Generalized linear models with a Poisson distribution and robust standard errors were used to estimate unadjusted and adjusted PRs and 95% CIs for associations of self-reported demographic and other characteristics with being a TGW. Bold indicates significance at $p < 0.05$.

[a]Missing and/or unknown responses folded into this category for modeling.

CIs, confidence intervals; PRs, prevalence ratios.

Among the 348 TGW, 185 (53.2%) were not using hormones and had not completed any GAS, 130 (37.4%) were taking hormones, but had not completed any GAS, 14 (4.0%) had completed GAS, but were not taking hormones, and 19 (5.5%) had completed at least one GAS and were also taking hormones.

Among TGW, being attracted to mostly or only men was independently associated with taking hormones (Table 3). Compared to those older than 23 years, younger TGW were less likely to have completed GAS. TGW who had ever used methamphetamines were more likely to have undergone GAS.

Sexual behaviors

A greater proportion of cis-MSM than TGW reported engaging in insertive anal (69.8% vs. 20.7%, $p < 0.001$; Fig. 1A) and insertive vaginal sex (25.9% vs. 4.0%, $p < 0.001$), while a smaller proportion of cis-MSM than TGW reported engaging in receptive anal sex (49.2% vs. 84.2%, $p < 0.001$).

Among TGW, sexual behaviors in the past year varied by hormone use and completion of GAS (Fig. 1B, C). A greater proportion of those not taking hormones reported engaging in insertive anal sex (28.6% vs. 10.1%, $p < 0.001$) and insertive vaginal sex (6.5% vs. 0.7%, $p = 0.01$), while a greater proportion of those taking hormones reported engaging in receptive anal sex (95.3% vs. 75.9%, $p < 0.001$). A greater proportion of those who had completed GAS reported engaging in oral sex (81.8% vs. 63.5%, $p = 0.04$) and receptive anal sex (97.0% vs. 82.9%, $p = 0.04$). Engagement in insertive anal and insertive vaginal sex did not differ by completion of GAS, although only a very small number who had completed GAS reported engaging in either type of insertive sex.

Condom use

More TGW than cis-MSM reported having condomless insertive anal sex, while more cis-MSM reported using a condom at last sex with all or some partners (Fig. 2A). Although not statistically significant, more TGW reported having condomless receptive anal sex than cis-MSM. Condom use during insertive anal sex and receptive anal sex did not differ by hormone use or completion of GAS (Fig. 2B, C).

Pre-exposure prophylaxis knowledge, use, and interest

Of 1007 participants who responded to PrEP-related questions, 445 (44.2%) had ever heard of PrEP. This was similar between cis-MSM and TGW (44.5% vs. 43.7%, $p = 0.89$). Among those having heard of PrEP, a similar proportion of cis-MSM and TGW had ever

Table 3. Factors Associated with Gender Transition Status Among Transgender Women in Bangkok, Thailand

	Taking hormones		GAS	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age, years				
18–20	0.97 (0.70–1.33)	0.90 (0.63–1.29)	**0.17 (0.07–0.46)**	**0.17 (0.05–0.55)**
21–23	0.98 (0.75–1.28)	0.89 (0.66–1.21)	**0.37 (0.23–0.60)**	**0.36 (0.20–0.65)**
>23	Ref.	Ref.	Ref.	Ref.
Sexual attraction				
Men only	**5.24 (2.86–9.61)**	**4.99 (2.58–9.65)**	4.04 (0.96–17.06)	4.08 (0.78–21.42)
Both men and women	1.40 (0.79–2.49)	1.35 (0.71–2.58)	1.57 (0.51–4.80)	1.39 (0.40–4.80)
Women only[a]	Ref.	Ref.	Ref.	Ref.
Education level				
None/some elementary	Ref.	Ref.	Ref.	Ref.
High school	1.00 (0.40–2.50)	0.98 (0.44–2.18)	0.98 (0.18–5.28)	0.97 (0.20–4.74)
Vocational training	0.78 (0.26–2.30)	0.82 (0.30–2.22)	0.81 (0.12–5.64)	0.49 (0.06–3.90)
Some university	1.43 (0.59–3.45)	1.43 (0.65–3.13)	0.67 (0.13–3.50)	0.73 (0.15–3.51)
Completed University/more	0.99 (0.38–2.55)	0.88 (0.37–2.09)	1.96 (0.36–10.58)	1.06 (0.22–5.13)
Monthly income				
<15,000 Baht[a]	Ref.	Ref.	Ref.	Ref.
≥15,000 Baht	1.01 (0.82–1.24)	1.00 (0.79–1.26)	**1.45 (1.08–1.96)**	1.08 (0.81–1.44)
Length of current residence, years				
<1	0.95 (0.77–1.18)	0.91 (0.72–1.15)	1.14 (0.80–1.63)	1.25 (0.84–1.88)
1–2	1.01 (0.79–1.29)	0.96 (0.75–1.23)	1.18 (0.85–1.64)	1.14 (0.78–1.67)
>2[a]	Ref.	Ref.	Ref.	Ref.
Injection drug use (lifetime)				
Never[a]	Ref.	Ref.	Ref.	Ref.
Ever	1.10 (0.71–1.71)	0.99 (0.61–1.60)	1.29 (0.77–2.18)	0.98 (0.61–1.56)
Methamphetamine use (lifetime)				
Never[a]	Ref.	Ref.	Ref.	Ref.
Ever	1.14 (0.76–1.71)	1.09 (0.71–1.69)	**1.60 (1.06–2.43)**	**1.55 (1.00–2.41)**
Site				
RTA	Ref.	Ref.	Ref.	Ref.
VTC	0.89 (0.63–1.27)	0.98 (0.68–1.41)	0.62 (0.36–1.08)	0.88 (0.47–1.64)
No. of sex partners in past 6 months				
1 to 3	Ref.	Ref.	Ref.	Ref.
4 to 7	1.04 (0.85–1.26)	1.04 (0.85–1.27)	1.07 (0.84–1.35)	1.08 (0.82–1.41)
8 or more[a]	0.91 (0.72–1.13)	0.90 (0.71–1.15)	0.95 (0.73–1.23)	0.93 (0.70–1.25)
History of sex work in past 6 months				
No[a]	Ref.	Ref.	Ref.	Ref.
Yes	1.11 (0.86–1.42)	1.08 (0.83–1.40)	0.86 (0.60–1.25)	0.84 (0.58–1.21)
Forced sex				
Never[a]	Ref.	Ref.	Ref.	Ref.
Ever	1.15 (0.86–1.52)	1.15 (0.86–1.54)	0.89 (0.64–1.24)	0.96 (0.69–1.34)
Tested for HIV				
Never[a]	Ref.	Ref.	Ref.	Ref.
Ever	**1.22 (1.00–1.48)**	1.20 (0.97–1.47)	**1.41 (1.11–1.80)**	1.26 (0.97–1.66)

Using data from all available study visits completed by TGW participants, logistic regression with generalized estimating equations was used to estimate unadjusted and adjusted ORs and 95% CIs for factors potentially associated with (1) taking hormones and (2) having completed at least one GAS. Bold indicates significance at $p < 0.05$..

[a]Missing and/or unknown responses folded into this category for modeling.

GAS, gender affirmation surgery; ORs, odds ratios.

taken PrEP (9.9% vs 9.9%, $p = 1.00$). Interest in taking daily oral PrEP if it were available was similar by cis-MSM and TGW (50.4% vs. 52.6%, $p = 0.39$).

Discussion

This study demonstrated that TGW and cis-MSM are unique populations that potentially have different vulnerabilities to HIV and could benefit from tailored, gender-affirming, differentiated models of HIV prevention and care.

Sex work was more common among TGW than cis-MSM, consistent with prior research in Thailand.[8] Prior evidence suggests that TGW who engage in sex work are at increased risk for HIV compared to cisgender males or females who engage in sex work,[2] and

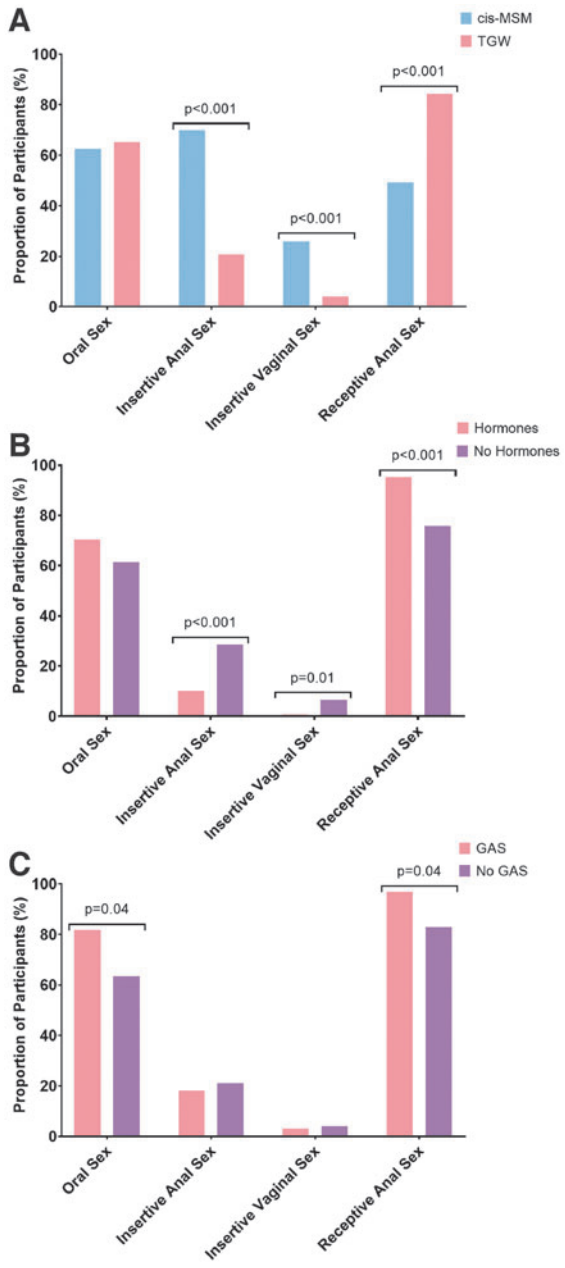

FIG. 1. Sexual behaviors of cisgender MSM and TGW enrolled in an HIV incidence study at two clinics in Bangkok, Thailand. **(A)** Comparison between TGW and cisgender MSM. **(B)** Among TGW, sexual behavior by hormone use. **(C)** Among TGW, sexual behavior by gender affirmation surgery status. Only statistically significant comparisons ($p < 0.05$) are shown. GAS, gender affirmation surgery; MSM, men who have sex with men; TGW, transgender women.

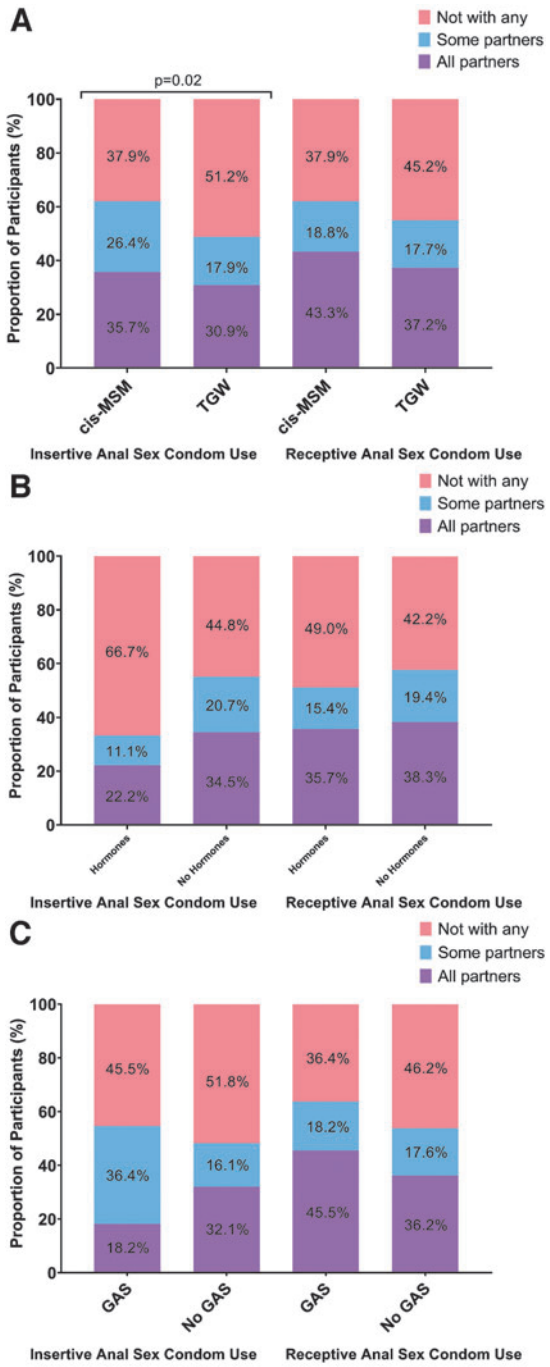

FIG. 2. Condom use during anal sex by cisgender MSM and TGW enrolled in an HIV incidence study at two clinics in Bangkok, Thailand. **(A)** Comparison between TGW and cisgender MSM. **(B)** Among TGW, condom use by hormone use. **(C)** Among TGW, condom use by gender affirmation surgery status. Only statistically significant comparisons ($p < 0.05$) are shown.

face unique biological, individual, interpersonal, and structural risk factors. This may be due to stigmatization, discrimination, and increased exposure to violence and criminalization.[23,24]

HIV prevention packages delivered to TGW must consider the unique complications of paid sex that may expose TGW to high-risk partners and gender-based violence,[23] and interfere with the ability of TGW to negotiate condom use, such as the innovative model established by the Tangerine Clinic at the Institute of HIV Research and Innovation providing an integrated transgender-specific package of services.[16]

TGW in this study, particularly those taking hormones and those having completed GAS, were more likely to engage in receptive anal sex than cis-MSM, and increasingly engaged in condomless insertive anal sex compared to cis-MSM. These findings are important given that receptive anal intercourse is associated with a higher risk of HIV transmission compared to vaginal intercourse,[2] and because TGW may have less bargaining power in negotiating condom use. Biomedical interventions to decrease HIV risk, such as PrEP, may be particularly desirable in such settings. We found that knowledge, prior use, and interest in taking PrEP were similar between cis-MSM and TGW.

While many MSM have concurrent sexual partnerships with both men and women, TGW in our study were more likely to report sexual attraction to exclusively men. This potentially provides partial explanation for the high HIV incidence among TGW in many studies, since receptive anal or neovaginal sex with male partners carries a higher risk for HIV transmission than insertive sex.[4] Consistent with prior reports, we found an HIV testing gap among TGW compared to cis-MSM.[15,25,26] Interventions are needed to identify at-risk TGW and appropriately link them to HIV testing services, and may be particularly important for individuals who do not perceive themselves to be at high risk for HIV[25] or who face increased stigmatization.

TGW were more likely than cis-MSM to be recently relocated to their current residence, previously identified as an independent HIV risk factor in studies of MSM in Asia.[27] This suggests an urgency to linking mobile TGW populations to appropriate HIV preventive services and facilitating transfers of care when residence changes. While a cross-sectional study in Thailand found that TGW had both lower levels of education and income than cis-MSM,[8] we found that despite lower educational attainment, TGW had higher monthly incomes than cis-MSM. As suggested by the commonality of sex work among TGW in this study, it may be that some TGW turn to nontraditional forms of employment, such as formal sex work or informal paid sex, to supplement income.

Among TGW in this study, hormone use was common, perhaps facilitated by the wide availability of over-the-counter hormones at pharmacies in Thailand.[28] However, $<10\%$ of TGW had undergone GAS either alone or in combination with hormone use. Interestingly, about half had engaged in neither, suggesting that other touch points for health care engagement may be needed to successfully deliver HIV prevention interventions in this population.

Filler use was prevalent among TGW, particularly those who also used hormones and/or who had undergone GAS, and injection of fillers outside of health care settings was common. Existing data suggest that unsafe injecting practices or without medical supervision potentially increases risk for HIV and other bloodborne infections such as hepatitis B and C.[29–31]

Transgender persons face barriers to health care access, including stigma and discrimination, which may contribute to health care avoidance or reluctance to seek care.[32,33] Thus, gender-affirming health care environments are vital to improving access to trans-specific services.[34–36] If conducted appropriately, health care encounters for filler or hormone injection could be leveraged to conduct education and connect TGW to other resources such as needle exchange programs.[29,30]

In addition to health care encounters for gender affirmation procedures, other medical touch points could be leveraged to provide continuing HIV and STI prevention services to TGW. For example, clinics that provide anonymous screening for HIV and other STIs may be useful for identifying and engaging vulnerable TGW.[37,38] Online platforms used for social networking and sex-finding by TGW may be leveraged to conduct online, supervised, HIV self-testing.[39] Transgender-specific packaging of HIV care and treatment services in pilot projects in Bangkok has been very successful,[16] including co-delivery with cosmetic and esthetic services. In addition, key population-led interventions have been successful in delivering PrEP to MSM and TGW.[40,41] Our data can inform the scale-up of further differentiated service delivery in Bangkok and elsewhere.

Limitations include that GAS was defined as surgery involving the breasts or genitals, prohibiting evaluation of risk differences between those having completed

only breast or only genital surgery. Individuals enrolled in a longitudinal cohort study may be more engaged in health seeking or promoting behaviors and potentially represent a subset of cis-MSM and TGW in this setting. This study exclusively enrolled participants who self-reported anal intercourse, so findings may not be generalizable to cis-MSM and TGW who do not engage in this sexual behavior.

In addition, behavioral data collected were based on self-report, and thus could potentially be influenced by social desirability or recall bias. While a small number of transgender men were enrolled, this study was underpowered to evaluate unique characteristics of this gender identity group. Finally, gender fluidity was observed, with over 20% of participants having a different gender identity at least once over the course of the study. Further research in this area is needed, given that gender identities are not fixed, particularly in Thailand, where the terms MSM and TGW represent ~15 different sexual and gender identities.[3,36,40,41]

TGW and cis-MSM are unique populations that are potentially differentially vulnerable to HIV. Tailored, rights- and gender-affirming models of HIV prevention and care in conjunction with improved access to health care for TGW are critical to reduce the burden of HIV in this population. Our study compliments the literature and contributes to a more comprehensive understanding of the specific HIV prevention needs of TGW as distinct from cis-MSM.

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Disclaimer

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Abbreviations Used

aORs = adjusted odds ratios
aPRs = adjusted prevalence ratios
ART = antiretroviral therapy
CIs = confidence intervals
cis-MSM = cisgender men who have sex with men
GAS = gender affirmation surgery
IQR = interquartile range
MSM = men who have sex with men
STI = sexually transmitted infection
TGW = transgender women
UNAIDS = United Nations Programme on HIV/AIDS
VIF = variable inflation factor